



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
WASHINGTON, D.C. 20555-0001

June 27, 2018

Mr. Bryan C. Hanson
Senior Vice President
Exelon Generation Company, LLC
President and Chief Nuclear Officer (CNO)
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2, AND BYRON STATION, UNIT NOS. 1 AND 2 - ISSUANCE OF AMENDMENTS REGARDING CLARIFICATION OF ROD POSITION REQUIREMENTS (CAC NOS. MF9951, MF9952, MF9953, AND MF9954; EPID L-2017-LLA-0249)

Dear Mr. Hanson:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 196 to Renewed Facility Operating License No. NPF-72 and Amendment No. 196 to Renewed Facility Operating License No. NPF-77 for the Braidwood Station, Units 1 and 2, respectively, and Amendment No. 202 to Renewed Facility Operating License No. NPF-37 and Amendment No. 202 to Renewed Facility Operating License No. NPF-66 for the Byron Station, Unit Nos. 1 and 2, respectively. The amendments are in response to your application dated June 30, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17187A191), as supplemented by letters dated October 25, 2017 (ADAMS Accession No. ML17298B536) and May 29, 2018 (ADAMS Accession No. ML18149A637).

B. Hanson

- 2 -

A copy of the related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,



Joel S. Wiebe, Senior Project Manager
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. STN 50-456, STN 50-457,
STN 50-454, and STN 50-455

Enclosures:

1. Amendment No. 196 to NPF-72
2. Amendment No. 196 to NPF-77
3. Amendment No. 202 to NPF-37
4. Amendment No. 202 to NPF-66
5. Safety Evaluation

cc w/enclosures: Listserv



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

EXELON GENERATION COMPANY, LLC

DOCKET NO. STN 50-456

BRAIDWOOD STATION, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 196
Renewed License No. NPF-72

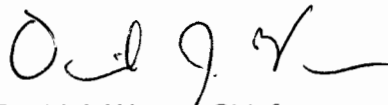
1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Exelon Generation Company, LLC (the licensee) dated June 30, 2017, as supplemented by letters dated October 25, 2017 and May 29, 2018, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-72 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 196 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



David J. Wrona, Chief
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications and Renewed
Facility Operating License

Date of Issuance: June 27, 2018



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

EXELON GENERATION COMPANY, LLC

DOCKET NO. STN 50-457

BRAIDWOOD STATION, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 196
Renewed License No. NPF-77

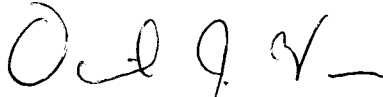
1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Exelon Generation Company, LLC (the licensee) dated June 30, 2017, as supplemented by letters dated October 25, 2017 and May 29, 2018, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-77 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 196 and the Environmental Protection Plan contained in Appendix B, both of which are attached to Renewed License No. NPF-72, dated January 27, 2016, are hereby incorporated into the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



David J. Wrona, Chief
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications and Renewed
Facility Operating License

Date of Issuance: June 27, 2018

ATTACHMENT TO LICENSE AMENDMENT NOS. 196 AND 196

RENEWED FACILITY OPERATING LICENSE NOS. NPF-72 AND NPF-77

BRAIDWOOD STATION, UNITS 1 AND 2

DOCKET NOS. STN 50-456 AND STN 50-457

Replace the following pages of the Renewed Facility Operating Licenses and Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

License NPF-72

Page 3

License NPF-77

Page 3

TSs

3.1.4-4

3.1.5-1

3.1.5-2

3.1.6-1

3.1.6-2

3.1.6-3

3.1.7-1

3.1.7-2

Insert

License NPF-72

Page 3

License NPF-77

Page 3

TSs

3.1.4-4

3.1.5-1

3.1.5-2

3.1.6-1

3.1.6-2

3.1.6-3

3.1.7-1

3.1.7-2

3.1.7-3

3.1.7-4

- (2) Exelon Generation Company, pursuant to the Act and 10 CFR Part 70, to receive, possess and use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Final Safety Analysis Report, as supplemented and amended;
- (3) Exelon Generation Company, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
- (4) Exelon Generation Company, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
- (5) Exelon Generation Company, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

The licensee is authorized to operate the facility at reactor core power levels not in excess of 3645 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 196 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

- (2) Exelon Generation Company, LLC, pursuant to the Act and 10 CFR Part 70, to receive, possess and use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Final Safety Analysis Report, as supplemented and amended;
- (3) Exelon Generation Company, LLC, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
- (4) Exelon Generation Company, LLC, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
- (5) Exelon Generation Company, LLC, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

The licensee is authorized to operate the facility at reactor core power levels not in excess of 3645 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 196 and the Environmental Protection Plan contained in Appendix B, both of which are attached to Renewed License No. NPF-72, dated January 27, 2016, are hereby incorporated into the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition B or Required Action C.3 not met.	D.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.1.4.1 -----NOTE----- Not required to be performed for rods associated with inoperable rod position indicator or demand position indicator. -----</p> <p>Verify position of individual rods within alignment limit.</p>	In accordance with the Surveillance Frequency Control Program
<p>SR 3.1.4.2 Verify rod freedom of movement (trippability) by moving each rod not fully inserted in the core ≥ 10 steps in either direction.</p>	In accordance with the Surveillance Frequency Control Program
<p>SR 3.1.4.3 Verify rod drop time of each rod, from the fully withdrawn position, is ≤ 2.7 seconds from the beginning of decay of stationary gripper coil voltage to dashpot entry, with:</p> <p>a. $T_{avg} \geq 550^{\circ}\text{F}$; and</p> <p>b. All reactor coolant pumps operating.</p>	Prior to criticality after each removal of the reactor head

3.1 REACTIVITY CONTROL SYSTEMS

3.1.5 Shutdown Bank Insertion Limits

LCO 3.1.5 Each shutdown bank shall be within the insertion limits specified in the COLR.

-----NOTE-----
Not applicable to shutdown banks inserted while performing SR 3.1.4.2.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One shutdown bank inserted \leq 16 steps beyond the insertion limits specified in the COLR.	A.1 Verify all control banks are within the insertion limits specified in the COLR.	1 hour
	<u>AND</u>	
	A.2.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	A.2.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.3 Restore the shutdown bank to within the insertion limits specified in the COLR.	24 hours

(continued)

Shutdown Bank Insertion Limits
3.1.5

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One or more shutdown banks not within limits for reasons other than Condition A.	B.1.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	B.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	B.2 Restore shutdown bank(s) to within limits.	2 hours
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.5.1 Verify each shutdown bank is within the insertion limits specified in the COLR.	In accordance with the Surveillance Frequency Control Program

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Control Bank Insertion Limits

LCO 3.1.6 Each control bank shall be within the insertion, sequence, and overlap limits specified in the COLR.

-----NOTE-----
Not applicable to control banks inserted while performing SR 3.1.4.2.

APPLICABILITY: MODE 1,
MODE 2 with $k_{eff} \geq 1.0$.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Control bank A, B or C inserted ≤ 16 steps beyond the insertion, sequence, or overlap limits specified in the COLR.	A.1. Verify all shutdown banks are within the insertion limits specified in the COLR.	1 hour
	<u>AND</u>	
	A.2.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	A.2.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.3 Restore the control bank to within the insertion, sequence, and overlap limits specified in the COLR.	24 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Control bank insertion limits not met for reasons other than Condition A.	B.1.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	B.1.2 Initiate boration to restore SDM to within limit.	1 hour
C. Control bank sequence or overlap limits not met for reasons other than Condition A.	<u>AND</u>	
	B.2 Restore control bank(s) to within limits.	2 hours
	C.1.1 Verify SDM is within the limits specified in the COLR.	1 hour
D. Required Action and associated Completion Time not met.	<u>OR</u>	
	C.1.2 Initiate boration to restore SDM to within limit.	1 hour
	C.2 Restore control bank sequence and overlap to within limits.	2 hours
D.1 Be in MODE 2 with $k_{eff} < 1.0$.		6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.6.1	Verify estimated critical control bank position is within the limits specified in the COLR.	Within 4 hours prior to criticality
SR 3.1.6.2	Verify each control bank is within the insertion limits specified in the COLR.	In accordance with the Surveillance Frequency Control Program
SR 3.1.6.3	Verify each control bank not fully withdrawn from the core is within the sequence and overlap limits specified in the COLR.	In accordance with the Surveillance Frequency Control Program

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Rod Position Indication

LCO 3.1.7 The Digital Rod Position Indication (DRPI) System and the Demand Position Indication System shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

-----NOTE-----
Separate Condition entry is allowed for each inoperable DRPI and each demand position indicator.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One DRPI per group inoperable in one or more groups.	A.1 Verify the position of the rods with inoperable DRPIs.	Once per 8 hours
	<u>OR</u>	
	A.2 Verify the position of the rods with inoperable DRPIs.	8 hours
		<u>AND</u>
		Once per 31 EFPD thereafter
		<u>AND</u>
		8 hours after discovery of each unintended rod movement
		<u>AND</u>
		(continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	<p>OR</p> <p>A.3 Reduce THERMAL POWER TO \leq 50% RTP.</p>	<p>8 hours after each movement of rod with inoperable DRPI > 12 steps</p> <p><u>AND</u></p> <p>Prior to THERMAL POWER exceeding 50% RTP</p> <p><u>AND</u></p> <p>8 hours after reaching RTP</p> <p>8 hours</p>
B. More than one DRPI per group inoperable in one or more groups.	<p>B.1 Place the control rods under manual control.</p> <p><u>AND</u></p> <p>B.2 Restore inoperable DRPIs to OPERABLE status such that a maximum of one DRPI per group is inoperable.</p>	<p>Immediately</p> <p>24 Hours</p>

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. One or more DRPIs inoperable in one or more groups and associated rod has been moved > 24 steps in one direction since the last determination of the rod's position.</p>	<p>C.1 Initiate action to verify the position of the rods with inoperable DRPIs.</p>	<p>Immediately</p>
	<p><u>OR</u> C.2 Reduce THERMAL POWER to \leq 50% RTP.</p>	<p>8 hours</p>
<p>D. One or more demand position indicators per bank inoperable in one or more banks.</p>	<p>D.1.1 Verify by administrative means all DRPIs for the affected bank(s) are OPERABLE.</p>	<p>Once per 8 hours</p>
	<p><u>AND</u> D.1.2 Verify the most withdrawn rod and the least withdrawn rod of the affected bank(s) are \leq 12 steps apart.</p>	<p>Once per 8 hours</p>
	<p><u>OR</u> D.2 Reduce THERMAL POWER to \leq 50% RTP.</p>	<p>8 hours</p>
<p>E. Required Action and associated Completion Time not met.</p>	<p>E.1 Be in MODE 3.</p>	<p>6 hours</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.1.7.1 -----NOTE----- Not required to be met for DRPIs associated with rods that do not meet LCO 3.1.4. ----- Verify each DRPI agrees within 12 steps of the group demand position for the full indicated range of rod travel.</p>	<p>Prior to criticality after each removal of the reactor head</p>



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

EXELON GENERATION COMPANY, LLC

DOCKET NO. STN 50-454

BYRON STATION, UNIT NO. 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 202
Renewed License No. NPF-37

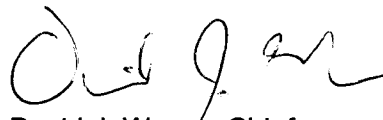
1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Exelon Generation Company, LLC (the licensee) dated June 30, 2017, as supplemented by letters dated October 25, 2017 and May 29, 2018, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-37 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 202 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



David J. Wrona, Chief
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications and Renewed
Facility Operating License

Date of Issuance: June 27, 2018



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

EXELON GENERATION COMPANY, LLC

DOCKET NO. STN 50-455

BYRON STATION, UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 202
Renewed License No. NPF-66

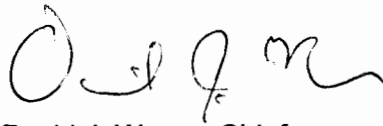
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 - A. The application for amendment by Exelon Generation Company, LLC (the licensee) dated June 30, 2017, as supplemented by letters dated October 25, 2017 and May 29, 2018, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-66 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A (NUREG-1113), as revised through Amendment No. 202 and the Environmental Protection Plan contained in Appendix B, both of which were attached to Renewed License No. NPF-37, dated November 19, 2015, are hereby incorporated into this renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



David J. Wrona, Chief
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications and Renewed
Facility Operating License

Date of Issuance: June 27, 2018

ATTACHMENT TO LICENSE AMENDMENT NOS. 202 AND 202
RENEWED FACILITY OPERATING LICENSE NOS. NPF-37 AND NPF-66
BYRON STATION, UNIT NOS. 1 AND 2
DOCKET NOS. STN 50-454 AND STN 50-455

Replace the following pages of the Renewed Facility Operating Licenses and Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

License NPF-37
Page 3

License NPF-66
Page 3

TSs

3.1.4-4
3.1.5-1
3.1.5-2
3.1.6-1
3.1.6-2
3.1.6-3
3.1.7-1
3.1.7-2

Insert

License NPF-37
Page 3

License NPF-66
Page 3

TSs

3.1.4-4
3.1.5-1
3.1.5-2
3.1.6-1
3.1.6-2
3.1.6-3
3.1.7-1
3.1.7-2
3.1.7-3
3.1.7-4

- (2) Pursuant to the Act and 10 CFR Part 70, to receive, possess and use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Updated Final Safety Analysis Report, as supplemented and amended;
- (3) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
- (4) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
- (5) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

The licensee is authorized to operate the facility at reactor core power levels not in excess of 3645 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 202 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Deleted.

(4) Deleted.

- (2) Pursuant to the Act and 10 CFR Part 70, to receive, possess and use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Updated Final Safety Analysis Report, as supplemented and amended;
- (3) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
- (4) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
- (5) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. The renewed license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

The licensee is authorized to operate the facility at reactor core power levels not in excess of 3645 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A (NUREG-1113), as revised through Amendment No. 202 and the Environmental Protection Plan contained in Appendix B, both of which were attached to Renewed License No. NPF-37, dated November 19, 2015, are hereby incorporated into this renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition B or Required Action C.3 not met.	D.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.1.4.1 -----NOTE----- Not required to be performed for rods associated with inoperable rod position indicator or demand position indicator. -----</p> <p>Verify position of individual rods within alignment limit.</p>	In accordance with the Surveillance Frequency Control Program
<p>SR 3.1.4.2 Verify rod freedom of movement (trippability) by moving each rod not fully inserted in the core ≥ 10 steps in either direction.</p>	In accordance with the Surveillance Frequency Control Program
<p>SR 3.1.4.3 Verify rod drop time of each rod, from the fully withdrawn position, is ≤ 2.7 seconds from the beginning of decay of stationary gripper coil voltage to dashpot entry, with:</p> <p>a. $T_{avg} \geq 550^{\circ}\text{F}$; and</p> <p>b. All reactor coolant pumps operating.</p>	Prior to criticality after each removal of the reactor head

3.1 REACTIVITY CONTROL SYSTEMS

3.1.5 Shutdown Bank Insertion Limits

LCO 3.1.5 Each shutdown bank shall be within the insertion limits specified in the COLR.

-----NOTE-----
Not applicable to shutdown banks inserted while performing SR 3.1.4.2.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One shutdown bank inserted \leq 16 steps beyond the insertion limits specified in the COLR.	A.1 Verify all control banks are within the insertion limits specified in the COLR.	1 hour
	<u>AND</u>	
	A.2.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	A.2.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.3 Restore the shutdown bank to within the insertion limits specified in the COLR.	24 hours

(continued)

Shutdown Bank Insertion Limits
3.1.5

ACTIONS (continued)		
CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One or more shutdown banks not within limits for reasons other than Condition A.	B.1.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	B.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	B.2 Restore shutdown bank(s) to within limits.	2 hours
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.5.1 Verify each shutdown bank is within the insertion limits specified in the COLR.	In accordance with the Surveillance Frequency Control Program

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Control Bank Insertion Limits

LCO 3.1.6 Each control bank shall be within the insertion, sequence, and overlap limits specified in the COLR.

-----NOTE-----
Not applicable to control banks inserted while performing SR 3.1.4.2.

APPLICABILITY: MODE 1,
MODE 2 with $k_{eff} \geq 1.0$.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Control bank A, B or C inserted ≤ 16 steps beyond the insertion, sequence, or overlap limits specified in the COLR.	A.1 Verify all shutdown banks are within the insertion limits specified in the COLR.	1 hour
	<u>AND</u>	
	A.2.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	A.2.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.3 Restore the control bank to within the insertion, sequence, and overlap limits specified in the COLR.	24 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Control bank insertion limits not met for reasons other than Condition A.	B.1.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	B.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	B.2 Restore control bank(s) to within limits.	2 hours
C. Control bank sequence or overlap limits not met for reasons other than Condition A.	C.1.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	C.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	C.2 Restore control bank sequence and overlap to within limits.	2 hours
D. Required Action and associated Completion Time not met.	D.1 Be in MODE 2 with $k_{eff} < 1.0$.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.6.1	Verify estimated critical control bank position is within the limits specified in the COLR.	Within 4 hours prior to criticality
SR 3.1.6.2	Verify each control bank is within the insertion limits specified in the COLR.	In accordance with the Surveillance Frequency Control Program
SR 3.1.6.3	Verify each control bank not fully withdrawn from the core is within the sequence and overlap limits specified in the COLR.	In accordance with the Surveillance Frequency Control Program

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Rod Position Indication

LC0 3.1.7 The Digital Rod Position Indication (DRPI) System and the Demand Position Indication System shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

-----NOTE-----
Separate Condition entry is allowed for each inoperable DRPI and each demand position indicator.

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One DRPI per group inoperable in one or more groups.</p>	<p>A.1 Verify the position of the rods with inoperable DRPIs.</p>	<p>Once per 8 hours</p>
	<p><u>OR</u></p> <p>A.2 Verify the position of the rods with inoperable DRPIs.</p>	<p>8 hours</p> <p><u>AND</u></p> <p>Once per 31 EFPD thereafter</p> <p><u>AND</u></p> <p>8 hours after discovery of each unintended rod movement</p> <p><u>AND</u></p> <p>(continued)</p>

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	<p>OR</p> <p>A.3 Reduce THERMAL POWER to \leq 50% RTP.</p>	<p>8 hours after each movement of rod with inoperable DRPI > 12 steps</p> <p><u>AND</u></p> <p>Prior to THERMAL POWER exceeding 50% RTP</p> <p><u>AND</u></p> <p>8 hours after reaching RTP</p> <p>8 Hours</p>
B. More than one DRPI per group inoperable in one or more groups.	<p>B.1 Place the control rods under manual control.</p> <p><u>AND</u></p> <p>B.2 Restore inoperable DRPIs to OPERABLE status such that a maximum of one DRPI per group is inoperable</p>	<p>Immediately</p> <p>24 hours</p>

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or more DRPIs inoperable in one or more groups and associated rod has been moved > 24 steps in one direction since the last determination of the rod's position.	C.1 Initiate action to verify the position of the rods with inoperable DRPIs.	Immediately
	<u>OR</u> C.2 Reduce THERMAL POWER to ≤ 50% RTP.	8 hours
D. One or more demand position indicators per bank inoperable in one or more banks.	D.1.1 Verify by administrative means all DRPIs for the affected bank(s) are OPERABLE.	Once per 8 hours
	<u>AND</u> D.1.2 Verify the most withdrawn rod and the least withdrawn rod of the affected bank(s) are ≤ 12 steps apart.	Once per 8 hours
	<u>OR</u> D.2 Reduce THERMAL POWER to ≤ 50% RTP.	8 hours
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.1.7.1 -----NOTE----- Not required to be met for DRPIs associated with rods that do not meet LCO 3.1.4. ----- Verify each DRPI agrees within 12 steps of the group demand position for the full indicated range of rod travel.</p>	<p>Prior to criticality after each removal of the reactor head</p>



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION RELATED
TO AMENDMENT NO. 196 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-72,
AMENDMENT NO. 196 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-77,
AMENDMENT NO. 202 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-37,
AND AMENDMENT NO. 202 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-66

EXELON GENERATION COMPANY, LLC

BRAIDWOOD STATION, UNITS 1 AND 2

BYRON STATION, UNIT NOS. 1 AND 2

DOCKET NOS. STN 50-456, STN 50-457,

STN 50-454, AND STN 50-455

1.0 INTRODUCTION

By letter dated June 30, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17187A191), as supplemented by letters dated October 25, 2017 (ADAMS Accession No. ML17298B536) and May 29, 2018 (ADAMS Accession No. ML18149A637), Exelon Generation Company, LLC, (EGC, the licensee) submitted a license amendment request (LAR) to revise the technical specifications (TS) for Braidwood Station, Units 1 and 2, and Byron Station, Unit Nos. 1 and 2, to the U.S. Nuclear Regulatory Commission (NRC, the Commission). The supplements dated October 25, 2017 and May 29, 2018, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the Federal Register on August 29, 2017 (82 FR 41069).

Specifically, the application requests changes consistent with NRC-approved Technical Specifications Task Force (TSTF) Change Traveler TSTF-547, Revision 1, "Clarification of Rod Position Requirements." By letter dated December 31, 2015 (ADAMS Accession No. ML15365A610), the TSTF submitted to the NRC Revision 1 to Change Traveler TSTF-547. Change Traveler TSTF-547 proposes changes to Volumes 1 and 2 of NUREG-1431, Revision 4, "Standard Technical Specifications: Westinghouse Plants," dated April 2012 (ADAMS Accession Nos. ML12100A222 and ML12100A228, respectively). The proposed changes would revise the TS to provide time to repair rod movement failures that do not affect

rod operability, correct conflicts between the TS, and increase consistency between the subject TS and improve the format and presentation.

1.1 Description of Rod Cluster Control Assemblies

The rod cluster control assemblies (RCCA), or rods, are moved by their control rod drive mechanisms (CRDM). Each CRDM moves its RCCA one step (approximately 5/8 inch) at a time, but at varying rates (steps per minute) depending on the signal output from the rod control system. The RCCAs are divided among control banks and shutdown banks. Each bank may be further subdivided into two groups to provide for precise reactivity control. A group consists of two or more RCCAs that step simultaneously. If a bank of RCCAs consists of two groups, the groups are moved in a staggered fashion, but always within one step of each other. All units have four control banks and five shutdown banks.

The shutdown banks are maintained either in the fully inserted or fully withdrawn position. The control banks are moved in an overlap pattern using the following withdrawal sequence: when control bank A reaches a predetermined height in the core, control bank B begins to move out with control bank A. Control bank A stops at the position of maximum withdrawal, and control bank B continues to move out. When control bank B reaches a predetermined height, control bank C begins to move out with control bank B. This sequence continues until control banks A, B, and C are at the fully withdrawn position, and control bank D is approximately halfway withdrawn. The insertion sequence is the opposite of the withdrawal sequence. The control rods are arranged in a radially symmetric pattern, so that control bank motion does not introduce radial asymmetries in the core power distributions.

The control banks are used for precise reactivity control of the reactor. The positions of the control banks are normally automatically controlled by the rod control system, but they can also be manually controlled. They are capable of adding negative reactivity very quickly (compared to adding soluble boron). The control banks must be maintained above designed insertion limits and three of the four are typically near the fully withdrawn position during normal full power operations.

The axial position of shutdown rods and control rods is indicated by two separate and independent systems, which are the demand position indication system (commonly called group step counters) and the digital rod position indication (DRPI) system. The demand position indication system counts the pulses from the rod control system that moves the rods. There is one step counter for each group of rods. Individual rods in a group all receive the same signal to move and should, therefore, all be at the same position indicated by the group step counter for that group. The demand position indication system is considered highly precise (± 1 step or $\pm 5/8$ inch); however, it is not a reliable indicator of rod position because it is a demanded position indication, not an actual position indication. If a rod does not move one step for each demand pulse, the step counter will still count the pulse but incorrectly reflect the position of the rod.

The DRPI system provides a more reliable indication of actual rod position, but at a lower precision than the step counters. This system is based on inductive analog signals from a series of coils spaced along a hollow tube with a center to center distance of 3.75 inches or 6 steps. To increase the reliability of the system, the inductive coils are connected alternately to data channel A or B. Thus, if one data system fails, the DRPI will indicate rod position with an effective coil spacing of 7.5 inches or 12 steps. The DRPI system is capable of monitoring rod position within at least ± 12 steps.

2.0 REGULATORY EVALUATION

The categories of items required to be in the TSs are provided in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36(c). As required by 10 CFR 50.36(c)(2)(i), the TSs will include limiting conditions for operations (LCOs), which are the lowest functional capability or performance levels of equipment required for safe operation of the facility. Per 10 CFR 50.36(c)(2)(i), when an LCO of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TSs until the condition can be met. The regulation at 10 CFR 50.36(c)(3) requires TSs to include items in the category of surveillance requirements (SRs), which are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met. Also, 10 CFR 50.36(a)(1) states that a summary statement of the bases or reasons for such specifications, other than those covering administrative controls, shall also be included in the application, but shall not become part of the TSs.

The NRC staff's guidance for the review of TSs is in Chapter 16, "Technical Specifications," of NUREG-0800, Revision 3, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light-Water Reactor] Edition" (March 2010) (ADAMS Accession No. ML100351425). As described therein, as part of the regulatory standardization effort, the NRC staff has prepared Standard Technical Specifications (STs) for each of the LWR nuclear designs. NUREG-1431, Revision 4, contains the STs for Westinghouse-designed plants.

3.0 TECHNICAL EVALUATION

3.1 Description of Proposed Changes

This safety evaluation (SE) addresses proposed changes to TS 3.1.4, "Rod Group Alignment Limits," TS 3.1.5, "Shutdown Bank Insertion Limits," TS 3.1.6, "Control Bank Insertion Limits," and TS 3.1.7, "Rod Position Indication." The specific proposed changes are described in the following subsections. The discussion is applicable to both Braidwood and Byron Stations.

3.1.1 Provide Time to Correct Rod Movement Failures that Do Not Affect Operability

The current TS 3.1.5 states in part:

LCO 3.1.5 Each shutdown bank shall be within the insertion limits specified in the COLR.

----- NOTE -----
This LCO is not applicable while performing SR 3.1.4.2.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more shutdown banks not within limits.	A.1.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	

	A.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.2 Restore shutdown bank(s) to within limits.	2 hours
B. Required Action and associated Completion Time not met	B.1 Be in MODE 3.	6 hours

The proposed change would change the note to specifically refer to shutdown banks.

The proposed change would add a new Condition A to TS 3.1.5 that would require actions with one shutdown bank inserted ≤ 16 steps beyond the insertion limits specified in the core operating limit report (COLR).

The existing Condition A would be renumbered as Condition B and would be modified to apply for one or more shutdown banks not within limits for reasons other than Condition A. The existing Required Actions (RAs) A.1.1, A.1.2, and A.2, would be renumbered as B.1.1, B.1.2, and B.2. The existing Condition B and RA B.1 would be renumbered as Condition C and RA C.1.

The shutdown banks must be within their insertion limits any time the reactor is critical or approaching criticality. This ensures that a sufficient amount of negative reactivity is available to shut down the reactor and maintain the required shutdown margin (SDM) following a reactor trip.

Therefore proposed TS 3.1.5 would state:

LCO 3.1.5 Each shutdown bank shall be within the insertion limits specified in the COLR.

----- NOTE -----
 Not applicable to shutdown banks inserted while performing SR 3.1.4.2.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One shutdown bank inserted ≤ 16 steps beyond the insertion limits specified in the COLR.	A.1 Verify all control banks are within the insertion limits specified in the COLR.	1 hour
	<u>AND</u>	

	<p>A.2.1 Verify SDM is within the limits specified in the COLR.</p> <p><u>OR</u></p> <p>A.2.2 Initiate boration to restore SDM to within limit.</p> <p><u>AND</u></p> <p>A.3 Restore the shutdown bank to within the insertion limits specified in the COLR.</p>	<p>1 hour</p> <p>1 hour</p> <p>24 hours</p>
<p>B. One or more shutdown banks not within limits for reasons other than Condition A.</p>	<p>B.1.1 Verify SDM is within the limits specified in the COLR.</p> <p><u>OR</u></p> <p>B.1.2 Initiate boration to restore SDM to within limit.</p> <p><u>AND</u></p> <p>B.2 Restore shutdown bank(s) to within limits.</p>	<p>1 hour</p> <p>1 hour</p> <p>2 hours</p>
<p>C. Required Action and associated Completion Time not met.</p>	<p>C.1 Be in MODE 3.</p>	<p>6 hours</p>

The current TS 3.1.6 states, in part:

LCO 3.1.6 Each control bank shall be within the insertion, sequence, and overlap limits specified in the COLR.

----- NOTE -----
 This LCO is not applicable while performing SR 3.1.4.2.

APPLICABILITY: MODE 1,
 MODE 2 with $K_{eff} \geq 1.0$.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Control bank insertion limits not met.	A.1.1 Verify SDM is within the limits specified in the COLR. <u>OR</u>	1 hour
	A.1.2 Initiate boration to restore SDM to within limit. <u>AND</u>	1 hour
	A.2 Restore control bank(s) to within limits.	2 hours
B. Control bank sequence or overlap limits not met.	B.1.1 Verify SDM is within the limits specified in the COLR. <u>OR</u>	1 hour
	B.1.2 Initiate boration to restore SDM to within limit. <u>AND</u>	1 hour
	B.2 Restore control bank sequence and overlap to within limits.	2 hours
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 2 with $K_{eff} < 1.0$.	6 hours

The proposed change would change the note to specifically refer to control banks.

The proposed change would add a new Condition A to TS 3.1.6 that would require actions, if control bank A, B, or C is inserted ≤ 16 steps beyond the insertion, sequence, and overlap limits specified in the COLR.

The existing Condition A would be renumbered as Condition B and would be modified to apply for control bank insertion limits that are not met for reasons other than Condition A. The existing RAs A.1.1, A.1.2, and A.2, would be renumbered as B.1.1, B.1.2, and B.2.

The existing Condition B would be renumbered as Condition C and would be modified to apply when control bank sequence or overlap limits are not met for reasons other than Condition A. The existing RAs B.1.1, B.1.2, and B.2 would be renumbered as C.1.1, C.1.2, and C.2. Existing Condition C and RA C.1 would be renumbered as Condition D and RA D.1.

The limits on control banks sequence, overlap, and physical insertion, as defined in the COLR, must be maintained because they serve the function of preserving power distribution, ensuring that the SDM is maintained, ensuring that ejected rod worth is maintained, and ensuring adequate negative reactivity insertion is available on trip.

Therefore, proposed TS 3.1.6 would state:

LCO 3.1.6 Each control bank shall be within the insertion, sequence, and overlap limits specified in the COLR.

----- NOTE -----
 Not applicable to control banks inserted while performing SR 3.1.4.2.

APPLICABILITY: MODE 1,
 MODE 2 with $K_{eff} \geq 1.0$.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Control bank A, B or C inserted ≤ 16 steps beyond the insertion, sequence, or overlap limits specified in the COLR.	A.1 Verify all shutdown banks are within the insertion limits specified in the COLR.	1 hour
	<u>AND</u>	
	A.2.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	A.2.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.3 Restore the control bank to within the insertion, sequence, and overlap limits specified in the COLR.	24 hours
B. Control bank insertion limits not met for reasons other than Condition A.	B.1.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	

	<p>B.1.2 Initiate boration to restore SDM to within limit.</p> <p><u>AND</u></p> <p>B.2 Restore control bank(s) to within limits.</p>	<p>1 hour</p> <p>2 hours</p>
<p>C. Control bank sequence or overlap limits not met for reasons other than Condition A.</p>	<p>C.1.1 Verify SDM is within the limits specified in the COLR.</p> <p><u>OR</u></p> <p>C.1.2 Initiate boration to restore SDM to within limit.</p> <p><u>AND</u></p> <p>C.2 Restore control bank sequence and overlap to within limits.</p>	<p>1 hour</p> <p>1 hour</p> <p>2 hours</p>
<p>D. Required Action and associated Completion Time not met.</p>	<p>D.1 Be in MODE 2 with $k_{eff} < 1.0$.</p>	<p>6 hours</p>

3.1.2 Provide an Alternative to Frequent Verification of Rod Position

The current TS 3.1.7 states, in part:

LCO 3.1.7 The Digital Rod Position Indication (DRPI) System and the Demand Position Indication System shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

----- NOTE -----
 Separate Condition entry is allowed for each inoperable DRPI and each demand position indicator.

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One DRPI per group inoperable for one or more groups.</p>	<p>A.1 Verify the position of the rods with inoperable DRPIs.</p>	<p>Once per 8 hours</p>

	<u>OR</u> A.2 Reduce THERMAL POWER to ≤ 50% RTP.	8 hours
B. One or more rods with inoperable DRPIs have been moved in excess of 24 steps in one direction since the last determination of the rod's position.	B.1 Initiate action to verify the position of the rods with inoperable DRPIs. <u>OR</u> B.2 Reduce THERMAL POWER to ≤ 50% RTP.	Immediately 8 hours
C. One demand position indicator per bank inoperable for one or more banks	C.1.1 Verify by administrative means all DRPIs for the affected bank(s) are OPERABLE. <u>AND</u> C.1.2 Verify the most withdrawn rod and the least withdrawn rod of the affected bank(s) are ≤ 12 steps apart. <u>OR</u> C.2 Reduce THERMAL POWER to ≤ 50% RTP.	Once per 8 hours Once per 8 hours 8 hours
D. Required Action and associated Completion Time not met.	D.1 Be in MODE 3.	6 hours

The TS 3.1.7, "Rod Position Indication," requires that the DRPI system and the demand position indication system be operable during Startup and Power Operation. Condition A applies for one DRPI per group of rods inoperable for one or more groups of rods.

As noted in the TS Bases 3.1.7, verification of rod position can be determined by use of either the moveable incore detectors or the Power Distribution Monitoring system (PDMS).

The proposed change would add a new RA to Condition A as an alternative to the once per 8-hour verification of rod position. Also, an editorial change would be made to Condition A and Condition C to change "for" to "in." This would not change the technical meaning of the Conditions.

A new Condition B would be added. As noted above, the Braidwood and Byron TS were based on NUREG-1431, Revision 1, which did not have a condition for more than one DRPI per group inoperable. The new Condition B and RAs would be incorporated into the Braidwood and Byron TS. As a result of this addition, the existing Condition B would be renumbered as Condition C, the existing Condition C would be renumbered as Condition D, and the existing Condition D would be renumbered as Condition E.

The existing Condition B (renumbered as Condition C) would be revised to contain similar terminology to Condition A and the new Condition B for consistency.

The existing Condition C (renumbered as Condition D), would be revised from "One demand position indicator per bank inoperable for one or more banks" to "One or more demand position indicators per bank inoperable in one or more banks." The proposed change would make the terminology consistent with the Note that states, "Separate Condition entry is allowed for each inoperable DRPI and each demand position indicator."

The 12-step agreement limit between the bank demand position indication system and the DRPI system indicates that the demand position indication system is adequately calibrated, and can be used for indication of the measurement of control rod bank position. When one DRPI per group fails, the position of the rod may still be determined indirectly by use of either the movable incore detectors or PDMS.

Therefore, proposed TS 3.1.7 would state:

LCO 3.1.7 The Digital Rod Position Indication (DRPI) System and the Demand Position Indication System shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

----- NOTE -----
 Separate Condition entry is allowed for each inoperable DRPI and each demand position indicator.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One DRPI per group inoperable in one or more groups.	A.1 Verify the position of the rods with inoperable DRPIs.	Once per 8 hours
	<u>OR</u>	
	A.2 Verify the position of the rods with inoperable DRPIs	8 hours
		<u>AND</u>
		Once per 31 EFPD thereafter
		<u>AND</u>

	<p style="text-align: center;"><u>OR</u></p> <p>A.3 Reduce THERMAL POWER to \leq 50% RTP.</p>	<p>8 hours after discovery of each unintended rod movement</p> <p><u>AND</u></p> <p>8 hours after each movement of rod with inoperable DRPI > 12 steps</p> <p><u>AND</u></p> <p>Prior to THERMAL POWER exceeding 50% RTP</p> <p><u>AND</u></p> <p>8 hours after reaching RTP</p> <p>8 hours</p>
<p>B. More than one DRPI per group inoperable in one or more groups</p>	<p>B.1 Place the control rods under manual control.</p> <p><u>AND</u></p> <p>B.2 Restore inoperable DRPIs to OPERABLE status such that a maximum of one DRPI per group is inoperable.</p>	<p>Immediately</p> <p>24 hours</p>
<p>C. One or more DRPIs inoperable in one or more groups and associated rod has been moved > 24 steps in one direction since the last</p>	<p>C.1 Initiate action to verify the position of the rods with inoperable DRPIs.</p> <p><u>OR</u></p> <p>C.2 Reduce THERMAL</p>	<p>Immediately</p> <p>8 hours</p>

determination of the rod's position.	POWER to \leq 50% RTP.	
D. One or more demand position indicators per bank inoperable in one or more banks.	D.1.1 Verify by administrative means all DRPIs for the affected bank(s) are OPERABLE.	Once per 8 hours
	<u>AND</u>	
	D.1.2 Verify the most withdrawn rod and the least withdrawn rod of the affected bank(s) are \leq 12 steps apart.	Once per 8 hours
	<u>OR</u>	
	D.2 Reduce THERMAL POWER to \leq 50% RTP.	8 hours
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3.	6 hours

3.1.3 Correct Conflicts Between TS 3.1.4 and TS 3.1.7

The current SR 3.1.4.1 states:

SURVEILLANCE		FREQUENCY
SR 3.1.4.1	Verify individual rod positions within alignment limit.	In accordance with the Surveillance Frequency Control Program

The SR 3.1.4.1 requires verification that individual rod positions are within the alignment limits in accordance with the surveillance frequency control program (SFCP). The proposed change is the addition of a Note to SR 3.1.4.1 stating that the SR is not required to be performed for rods associated with inoperable rod position indicator or demand position indicator. This Note is proposed to be added because SR 3.1.4.1 cannot be performed for rods with an inoperable demand position indicator. An editorial wording change is also proposed for SR 3.1.4.1 to make it consistent with the wording of TS 3.1.7 RA A.1.

Therefore, proposed SR 3.1.4.1 would state:

SURVEILLANCE		FREQUENCY
SR 3.1.4.1	<p>----- NOTE -----</p> <p>Not required to be performed for rods associated with inoperable rod position indicator or demand position indicator.</p> <p>-----</p> <p>Verify position of individual rods within alignment limit.</p>	In accordance with the Surveillance Frequency Control Program

The current SR 3.1.7.1, states:

SURVEILLANCE		FREQUENCY
SR 3.1.7.1	Verify each DRPI agrees within 12 steps of the group demand position for the full indicated range of rod travel.	Prior to criticality after each removal of the reactor head

The LCO 3.1.4 specifies that all shutdown and control rods shall be operable and individual indicated rod positions shall be within 12 steps of their group step counter demand position. SR 3.1.7.1 requires verification that each DRPI agrees within the required steps of the group demand position for the full indicated range of rod travel. The proposed change is the addition of a Note to SR 3.1.7.1 stating that the SR would not be required to be met for rods that do not meet LCO 3.1.4.

Therefore, proposed SR 3.1.7.1 would state:

SURVEILLANCE		FREQUENCY
SR 3.1.7.1	<p>----- NOTE -----</p> <p>Not required to be met for DRPIs associated with rods that do not meet LCO 3.1.4.</p> <p>-----</p> <p>Verify each DRPI agrees within 12 steps of the group demand position for the full indicated range of rod travel.</p>	Prior to criticality after each removal of the reactor head

3.1.4 Other Proposed Changes

The proposed changes described in this section are editorial and do not change the technical content.

1. TSTF-547 proposes to eliminate TS 3.1.4, Condition B, RA B.1, and to combine RAs B.2.4 and B.2.5. RA B.1 was previously eliminated during the Braidwood and Byron Station TS transition from current technical specifications (CTS) to NUREG-1431, Revision 1. RAs B.2.4 and B.2.5 were previously combined in Amendment 110 (Braidwood Station) and Amendment 116 (Byron Station) (ADAMS Accession No. ML010510325). No additional changes are necessary.
2. LCO 3.1.5 and LCO 3.1.6 contain a Note modifying their Applicability that states "This LCO is not applicable while performing SR 3.1.4.2." The proposed change would revise the Notes to state: "Not applicable to shutdown banks inserted while performing SR 3.1.4.2," for LCO 3.1.5; and "Not applicable to control banks inserted while

performing SR 3.1.4.2," for LCO 3.1.6. This change clarifies the Note and does not alter its meaning.

3. In TSTF-547, TS 3.1.7 is revised to consistently use the defined abbreviation "DRPI." This affects the Actions Note, RA A.1, RA B.2, and RA C.1. Consistent use of the defined abbreviation "DRPI" was previously adopted during the Braidwood and Byron Station TS transition from CTS to NUREG-1431, Revision 1; therefore, this change is not applicable to the Braidwood and Byron Station TS.
4. TS 3.1.7, Condition A, is revised from "for one or more groups" to the more standard terminology "in one or more groups." This change does not alter the meaning.
5. TSTF-547 proposes to delete TS 3.1.7, RA B.3, as it is redundant to RA A.1. As noted above, the Braidwood and Byron Station TS were based on NUREG-1431 Revision 1, which did not have a condition for more than one DRPI per group inoperable (i.e., no TS 3.1.7, Condition B). The new Condition B and associated RAs (as shown in TSTF-547) will be incorporated into the Braidwood and Byron Station TS; therefore, deletion of RA B.3 is not applicable.
6. The existing TS 3.1.7, Condition B (renumbered as Condition C), is revised to contain similar terminology to Condition A and the new Condition B for consistency. The current wording of the existing Condition B states, "One or more rods with inoperable DRPIs have been moved in excess of 24 steps in one direction since the last determination of the rod's position." The proposed change rewords the renumbered Condition C to state: "One or more DRPIs inoperable in one or more groups and associated rod has been moved >24 steps in one direction since the last position determination." This change does not alter the meaning.
7. The existing TS 3.1.7, Condition C (renumbered as Condition D), is revised from "One demand position indicator per bank inoperable for one or more banks" to "One or more demand position indicators per bank inoperable in one or more banks." The proposed change makes the terminology consistent with the Note modifying the RAs as discussed in the following paragraph.

The current TS 3.1.7 is modified by a Note which states, "Separate Condition entry is allowed for each inoperable DRPI and each demand position indicator." The Bases for the Note state that the Note is acceptable because the RAs for each Condition provide appropriate compensatory actions for each inoperable indicator. There is one demand position indicator per group of rods. For banks with two groups of rods, there are two demand indicators per bank. The separate condition entry Note modifying the TS 3.1.7 Actions states that separate condition entry is allowed for each inoperable demand position indicator which means that the renumbered Condition D is applicable to more than one inoperable demand position indicator per bank. The proposed change makes the renumbered Condition D terminology consistent with the Note.

3.2 Evaluation

The NRC staff reviewed the proposed changes to the TSs and the technical justification for the changes proposed in the license amendment request (LAR) to ensure that the reasoning was logical, complete, and clearly written as described in Chapter 16 of NUREG-0800. The NRC staff also reviewed the proposed changes for continued compliance with the requirements of 10 CFR 50.36 and for consistency with conventional terminology and with the format and usage

rules embodied in the STS. In its SE for TSTF-547, Revision 1, the NRC staff did not specify any limitations or conditions for adoption of the Traveler by future applicants.

Although the TS bases are not part of the TS, the NRC staff confirmed that the TS bases described the basis for each revised TS requirement accurately as described in Chapter 16 of NUREG-0800.

3.2.1 Provide Time to Correct Rod Movement Failures that Do Not Affect Operability

The proposed new Condition A of TSs 3.1.5 and 3.1.6 for shutdown and control bank insertion limits would allow 24 hours to restore a single bank to be within its insertion limit when inserted below the insertion limit. With one shutdown or control bank inserted a maximum of 16 steps below the rod insertion limit, the RAs associated with new Condition A would also require verification that all other control and shutdown banks are within the insertion limits; and verification that the SDM is maintained or established. The completion time (CT) for these RAs would be 1 hour.

The new conditions define limits of both duration and insertion if a bank is immovable due to failures external to the CRDM. A maximum of one control or shutdown bank may be inserted beyond the limits for a maximum of 24 hours provided all other banks are within the insertion limits and that the reactor could be shut down using control rods or boration. The new Condition A imposes a limit of ≤ 16 steps beyond the insertion limit. Given that SR 3.1.4.2 requires movement of the control and shutdown rods a minimum of 10 steps in either direction, the NRC staff asked the licensee to provide justification for the use of ≤ 16 steps in Condition A in LCOs 3.1.5 and 3.1.6 and explain how this is consistent with that approved in the NRC staff's SE for TSTF-547. In its letter dated October 25, 2017, the licensee responded as follows:

The selection " ≤ 16 steps" for these LCOs is consistent with the statement in the NRC's Safety Evaluation for TSTF-547 that specifies: "The value of [16] steps corresponds to the minimum number of steps that the rods must be moved to ensure correct performance of SR 3.1.4.2." The value of 16 steps is based on the design of the Digital Rod Position Indication (DRPI) System.

The licensee then went on to describe the DRPI system design. Based on the design, a light emitting diode (LED) will illuminate every 6 steps of rod movement. Therefore, to verify 10 steps of rod movement, a change of two LEDs must be observed, i.e., the bank must be inserted 12 steps, as an insertion of only 10 steps may result in only one DRPI LED change. In addition, normal DRPI system accuracy is ± 4 steps. Therefore, the value of 16 steps corresponds to the minimum number of steps that the rods must be moved to ensure correct performance of SR 3.1.4.2. Based on the licensee's explanation, the NRC staff finds that the plant-specific value of ≤ 16 steps is appropriate to meet the requirements of SR 3.1.4.2 and is acceptable for use in LCOs 3.1.5 and 3.1.6.

The NRC staff reviewed the justification for the proposed addition of Condition A to TS 3.1.5 and TS 3.1.6 provided in the Technical Evaluation Section of Traveler TSTF-547, to ensure that the reasoning is logical, complete, and clearly written. The justification in Traveler TSTF-547 states:

1. All control and shutdown rod assemblies are required to be Operable. If a rod is untrippable (i.e., inoperable), then a plant shutdown is required in accordance with LCO 3.1.4, Condition A.
2. Only one control bank and shutdown bank may be inserted beyond insertion limits by no more than 16 steps. If one or more control banks or shutdown banks

exceed the insertion limit, a brief time period is permitted to correct the condition and then a plant shutdown is required.

3. If one rod is not within the alignment limits, adequate SDM is verified and a power reduction is required by LCO 3.1.4, Condition B. If more than one rod is not within the alignment limit as defined in LCO 3.1.4, adequate SDM is verified and a plant shutdown is required.

The insertion limits are established to ensure a sufficient amount of negative reactivity can be rapidly inserted to shut down the reactor. The NRC staff finds that allowing continued full-power operations for 24 hours with a rod movement failure is acceptable for the following reasons:

1. shutdown margin continues to be met;
2. all control and shutdown rods are trippable – i.e., capable of being rapidly inserted into the core;
3. only one bank may exceed insertion limits by no more than a specified number of steps;
4. all immovable rod assemblies are aligned; and
5. the rods must be restored to within the insertion limits within 24 hours.

The change to TSs 3.1.5 and 3.1.6 to provide time to correct rod movement failures that do not affect operability will allow sufficient time for diagnosis and repairs while maintaining the safety function of the control rods since the affected rods are still trippable. The thermal margins may be affected by power distribution changes due to control rod bank insertion, both during the insertion and during the resulting local xenon transient. However, insertions at or near the typical value of 16 steps from fully withdrawn, as provided in the proposed changes to TSs 3.1.5 and 3.1.6, would result in a very small negative reactivity impact at the top of active fuel. The resulting effect on the axial power distribution is not expected to be significant. In addition, alignment of all rods with the rod bank position (as per LCO 3.1.4) must be maintained and it will be verified that the reactor can still be shut down. Therefore, the NRC staff has determined that the proposed 24-hour CT for Condition A in TSs 3.1.5 and 3.1.6 specifying shutdown bank and control bank insertion limits is acceptable.

The NRC staff concludes that TS 3.1.5 and TS 3.1.6, as modified by the addition of Condition A, continue to specify the minimum performance level of equipment needed for safe operation of the facility as an LCO; and continue to specify the appropriate remedial measures if the LCO is not met. SRs are not being changed by the addition of Condition A. The NRC staff finds that the requirements of 10 CFR 50.36(c)(2) continue to be met because the minimum performance level of equipment needed for safe operation of the facility is contained in the LCO and the appropriate remedial measures are specified if the LCO is not met.

3.2.2 Provide an Alternative to Frequent Verification of Rod Position

The LCO 3.1.7 requires that the DRPI and the demand position indication system be Operable during Power Operation and Startup. When one or more DRPI per group are inoperable for one or more groups, current TS 3.1.7 requires verification of rod position once per 8 hours using the movable incore detectors or PDMS or to reduce thermal power to less than or equal to 50 percent rated thermal power (RTP) within 8 hours. The proposed change would provide an alternative set of RAs.

New RA A.2 would require the use of the movable incore detector system or PDMS to verify the position of the rod within 8 hours of the inoperability of DRPI, 8 hours after discovery of each unintended rod movement, 8 hours after each greater than 12 step movement of a rod with inoperable DRPI, prior to exceeding 50 percent RTP, 8 hours after reaching RTP, and once per 31 effective full power days thereafter.

TSTF-547 proposed a new RA A.2.2 that would require the inoperable DRPI to be restored to operable status prior to entering startup (MODE 2) from hot standby (MODE 3). In its letter dated May 29, 2018, the licensee requested to not include this RA. The licensee provided justification that showed that this RA would never be limiting or implemented because the RAs are joined by a logical "OR," any one of the RAs may be chosen. In addition, when an LCO is not met, LCO 3.0.4.a allows entry into a MODE in which an LCO is applicable when the associated actions to be entered permit continued operation in the MODE for an unlimited period of time. Since the LCO permits continued operation with the specified RAs, entering startup from hot standby is allowed. Based on the above, the NRC staff determined that not including a new RA A.2.2 is appropriate because it is unnecessary and could cause confusion.

The implementation of new RA A.2 would allow the use of an alternative monitoring scheme. This alternative method reduces potential wear on the movable incore detector system when PDMS is inoperable and also reduces the time required to perform the frequent rod position verifications. The NRC staff finds that the new RA A.2 and CT is appropriate because it requires verification of rod position following circumstances in which rod motion could occur. This is a more tailored approach than current TS 3.1.7 RA A.1, which requires verification of rod position using the moveable incore detector system or PDMS once per 8 hours, regardless of whether the rods have moved.

If the rod position indication is failed for an individual rod, its position is determined indirectly by the use of the moveable incore detectors or PDMS. The NRC staff has determined that this change, which verifies rod position based on the occurrence of events requiring rod motion, rather than determining position on a specified frequency, is acceptable because events requiring rod motion of the shutdown banks and control banks A, B, and C are relatively infrequent during steady state operation. Events involving significant movement of rods in control bank D are also relatively infrequent. The indirect determination of rod position is required after significant changes in power level or following substantial rod motion.

The addition of the Note to SR 3.1.4.1 stating that the SR is not required to be performed for rods associated with an inoperable rod position indicator or demand position indicator is appropriate because the RAs of TS 3.1.7 for an inoperable DRPI provide the appropriate actions for indirectly determining the position of the affected rods.

The NRC staff concludes that the addition of an alternative monitoring scheme to indirectly determine the position of rods associated with an inoperable DRPI is acceptable. TS 3.1.7, as modified, continues to specify the minimum performance level of equipment needed for safe operation of the facility as an LCO and continues to specify the appropriate remedial measures if the LCO is not met. The revised SR 3.1.4.1, which has been clarified to specify when it is required to be performed, continues to be an appropriate test to ensure that the necessary quality of systems is maintained. The NRC staff finds that the requirements of 10 CFR 50.36(c)(2) continue to be met because the minimum performance level of equipment needed for safe operation of the facility is contained in the LCO and the appropriate remedial measures are specified if the LCO is not met. The NRC staff finds that the requirements of 10 CFR 50.36(c)(3) continue to be met because the revised SR provides the appropriate testing to ensure the necessary quality of components is maintained and that the LCO will be met.

3.2.3 Correct Conflicts Between TS 3.1.4 and TS 3.1.7

The LCO 3.1.4 requires that all shutdown and control rods shall be operable and individual indicated rod positions shall be within 12 steps of their group step counter demand position. SR 3.1.4.1 requires verification of the individual rod positions within the alignment limit periodically. SR 3.1.4.1 cannot be performed for rods with an inoperable bank demand position indicator. Failure to meet an SR is considered a failure to meet an LCO requirement. Therefore, if SR 3.1.4.1 cannot be performed, entry into LCO 3.1.4 Condition C is required. LCO 3.1.4, Condition C, applies when more than one rod is not within the alignment limit. The RA associated with Condition C requires, in part, that the reactor be in hot standby within 6 hours.

LCO 3.1.7 requires the DRPI system and the demand position indication system to be operable. Current LCO 3.1.7, Condition C, applies if one indicator per bank is inoperable for one or more banks. The Condition C RAs require verification that all DRPIs for the affected banks are operable and require verification that the most withdrawn rod and least withdrawn rod of the affected banks are less than or equal to 12 steps apart once per 8 hours. Alternatively, thermal power must be reduced to less than or equal to 50 percent RTP.

A Note would be added to SR 3.1.4.1 stating that this SR is not required to be performed for rods associated with an inoperable rod position indicator or demand position indicator. The alignment limit is based on the demand position indicator. If the bank demand position indicator is inoperable, the SR cannot be performed.

Following the proposed modification of SR 3.1.4.1, Condition D (renumbered current Condition C) of LCO 3.1.7 would be the applicable condition to be entered in the event of inoperable demand position indicators. The RAs associated with Condition D of LCO 3.1.7 provide the appropriate actions in this situation by requiring that the DRPIs are operable and that the individual rods in the bank are not misaligned by more than 12 steps.

The SR 3.1.7.1 requires verification that each DRPI agrees within 12 steps of the group demand position for the full indicated range of rod travel. This SR is performed once prior to criticality after each removal of the reactor head. Failure to meet an SR is considered a failure to meet the LCO per SR 3.0.1. The requirements of SRs must be satisfied in between performances of the surveillance test itself. Therefore, if a control or shutdown rod is not within 12 steps of its bank demand position indication, then the requirements of both LCO 3.1.4 and LCO 3.1.7 are not met.

A Note would be added to SR 3.1.7.1 stating that this SR is not required to be met for DRPIs associated with rods that do not to meet LCO 3.1.4. If a rod is known not to be within 12 steps of the group demand position, LCO 3.1.4 provides the appropriate RAs. With one rod not within the alignment limit, Condition B requires verification of shutdown margin or boration until SDM is met, reduction in RTP, verification of shutdown margin once per 12 hours, verification of hot channel factors within limits, and reevaluation of safety analyses and confirming that continued operation is permissible. If more than one rod is misaligned, the SDM must be verified to be within limits or boration must be initiated to restore required SDM, and the plant must be shut down.

The NRC staff reviewed the technical justification for the proposed changes provided in the LAR and TSTF-547 for logical reasoning, completeness, and clarity. The purpose of the changes is to prescribe the appropriate Actions to be followed when equipment is inoperable.

The TS 3.1.4 provides limits on rod alignment to ensure acceptable power peaking factors and local linear heat rates and an acceptable shutdown margin, all of which are initial conditions in the applicable safety analyses. It is appropriate to consolidate requirements associated with rod misalignments in this TS. TS 3.1.7 provides requirements for instrumentation to monitor rod position. The instrumentation is used to verify that the rod alignment limits in TS 3.1.4 are satisfied. Similarly, it is appropriate to consolidate requirements associated with instrumentation operability in this TS.

The NRC staff concludes that the clarification notes to SRs 3.1.4.1 and 3.1.7.1 to specify configurations in which performance of the SRs is not required are appropriate. The TSs, as modified, continue to specify the minimum performance level of equipment needed for safe operation of the facility as an LCO, and continue to specify the appropriate remedial measures if the LCO is not met. The revised SRs 3.1.4.1 and 3.1.7.1 continue to be appropriate, because they ensure the necessary quality of systems is maintained and that the LCOs will be met. Based on the above, the NRC staff finds that the requirements of 10 CFR 50.36(c)(2) and 10 CFR 50.36(c)(3) continue to be met.

3.2.4 Other Proposed Changes

The changes described above in Section 3.1.4 were proposed to improve the presentation of the requirements or are administrative in nature.

The LCOs 3.1.5 and 3.1.6 contain a Note modifying their Applicability that states: "This LCO is not applicable while performing SR 3.1.4.2." The proposed change would revise the Notes to state: "Not applicable to shutdown banks inserted while performing SR 3.1.4.2," for LCO 3.1.5 and "Not applicable to control banks inserted while performing SR 3.1.4.2," for LCO 3.1.6. The NRC staff finds that this change is administrative in nature and does not alter the Note's meaning.

TS 3.1.7, Condition A, would be revised from "for one or more groups" to the more standard terminology "in one or more groups." The NRC staff finds that this change is administrative in nature and does not alter the condition's meaning.

The existing TS 3.1.7, Condition B (renumbered as Condition C), is revised to contain similar terminology to Condition A and the new Condition B for consistency. The current wording of the existing Condition B states, "One or more rods with inoperable DRPIs have been moved in excess of 24 steps in one direction since the last determination of the rod's position." The proposed change rewords the renumbered Condition C to state, "One or more DRPIs inoperable in one or more groups and associated rod has been moved > 24 steps in one direction since the last position determination." The NRC Staff finds that this change is administrative in nature and does not alter the condition's meaning.

The existing TS 3.1.7, Condition C (renumbered as Condition D), is revised from "One demand position indicator per bank inoperable for one or more banks" to "One or more demand position indicators per bank inoperable in one or more banks." The NRC staff finds that this change makes the terminology consistent with the Note modifying the RAs and that this change is administrative in nature and does not alter the condition's meaning.

There were several items noted in the LAR which state that TSTF-547 changes are not being applied as they are not applicable. This is due to TSTF-547 being based on NUREG-1431, Revision 4, while Braidwood and Byron Station TS are based on Revision 1. As an example, TSTF-547 deletes TS 3.1.7, Required Action B.2, "Monitor and record Reactor Coolant System

Tavg.” The Braidwood and Byron Station TS do not have the subject Condition B, so deletion of the associated RA B.2 is not applicable. Note that EGC did not request adopting TSTF-547 verbiage in its entirety due to variations from TSTF-547 that already exist in the current Braidwood Station and Byron Station TS. Therefore, the NRC staff reviewed only the proposed changes and did not review TSTF-547 modifications that were not proposed.

3.3 Summary of NRC Staff Conclusions

The regulations at 10 CFR 50.36 require that TSs include items in specified categories, including LCOs and SRs. The proposed changes would modify the LCOs, Conditions, RAs, CTs, and SRs applicable to control rod and shutdown rod insertion and alignment limits and the instrumentation to monitor rod position and alignment. The TSs would continue to specify the LCOs and specify the remedial measures to be taken if one of these requirements is not satisfied. The TSs would continue to specify the appropriate SRs for tests and inspections to ensure the necessary quality of affected structures, systems, and components is maintained and that the LCOs will be met. Based on the above, the NRC staff concludes that the proposed LCOs and SRs meet the requirements of 10 CFR 50.36(c)(2) and 10 CFR 50.36(c)(3), respectively, and are, therefore, acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission’s regulations, the Illinois State official was notified of the proposed issuance of the amendments on March 1, 2018. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20 and change surveillance requirements. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission previously issued a proposed finding on August 29, 2017 (82 FR 41069), that the amendments involve no significant hazards consideration, and there has been no public comment on such finding. The supplements dated October 25, 2017 and May 29, 2018, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the NRC staff’s original proposed no significant hazards consideration determination. Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR Section 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission’s regulations, and (3) the issuance of the

amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: R. Beaton

Date of issuance: June 27, 2018

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2, AND BYRON STATION, UNIT NOS. 1 AND 2 - ISSUANCE OF AMENDMENTS REGARDING CLARIFICATION OF ROD POSITION REQUIREMENTS (CAC NOS. MF9951, MF9952, MF9953, AND MF9954; EPID L-2017-LLA-0249) DATED JUNE 27, 2018

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